

REMARKS/ARGUMENTS

The Office Action mailed May 8, 2003, has been received and reviewed. Claims 1 through 4, 6, and 10 through 29 are currently pending in the application, in which claims 19 through 20, 25 and 26 through 29 have been withdrawn from consideration. Claims 5 and 7 through 9 were canceled. Applicants have amended claims 1 through 3, 11 through 18, and 21 through 24, and cancelled claim 10. Applicants respectfully request reconsideration of the application as amended herein.

Information Disclosure Statement

Applicants note the filing of a Supplemental Information Disclosure Statement herein on April 14, 2003, and note that no copy of the PTO/SB/08A was returned with the outstanding Office Action. Applicants respectfully request that the information cited on the PTO/SB/08A be made of record herein. For the convenience of the Examiner, Applicants have included copies of the IDS, the PTO/SB/08A, and the date-stamped postcard returned by the Office evidencing receipt.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 6,107,164 to Ohuchi Taken with U.S. Patent No. 6,181,569 to Chakravorty

Claims 1 through 3, 6, 10 through 14, 17, and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohuchi (U.S. Patent No. 6,107,164) in view of Chakravorty (U.S. Patent No. 6,181,569). Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir.

1991). (Emphasis added). The 35 U.S.C. § 103(a) obviousness rejections of claims 1 through 3, 6, 10 through 14, 17, and 23 are improper because they fail to establish a *prima facie* case of obviousness.

Claim 1 has been amended herein to recite the limitation of “forming a layer of encapsulant material over substantially all of said active surface and into said channels *such that a surface of said layer of encapsulant material has a pattern of depressions over said channels.*” (Emphasis added.) The amended limitation of Claim 1 is supported by the specification as originally filed at page 12, ¶ [0033] and in FIG. 2.

Ohuchi discloses a method of using grooves as alignment marks when dicing an encapsulated wafer. According to that method, a wafer 10 is cut between respective semiconductor elemental devices to define grooves 22 (col. 3, lines 9-13). Next, the surface of wafer 10 is sealed with a resin 23, which is polished to expose posts 4 (col. 3, lines 29-33). The back of wafer 10 is also polished to expose grooves 22 through the back of wafer 10 (col. 3, lines 36-42). Wafer 10 is then cut from the back side along grooves 22 to provide individual semiconductor devices (col. 3, lines 45-53). As such, the method disclosed by Ohuchi does not teach or suggest forming a layer of encapsulant material having a pattern of depressions over channels formed in a semiconductor substrate.

Chakravorty is directed to a method of fabricating chip size packages wherein a wafer 301 is encapsulated with a polymeric encapsulant layer 312 (col. 9, lines 55-59). Chakravorty also fails to teach or suggest forming a pattern of depressions over channels as recited in amended claim 1. In fact, Chakravorty expressly states that after encapsulation “the surface of wafer 301 is covered with the encapsulant, and thus the scribe lines are not visible (col. 12, lines 25-27).

In view of the foregoing, Applicants respectfully submit that neither of the cited references, either alone or in combination, teach or suggest all the limitations of claim 1 as amended herein. Therefore, claim 1 is allowable over the combination of Ohuchi and Chakravorty under the provisions of 35 U.S.C. § 103(a).

Claims 2, 3, 6, 10 through 14, 17, and 23, which depend from claim 1, are also allowable. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Obviousness Rejection Based on U.S. Patent No. 6,107,164 to Ohuchi taken with U.S. Patent No. 6,181,569 to Chakravorty, and further of U.S. Patent No. 4,610,079 to Abe et al.

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohuchi (U.S. Patent No. 6,107,164) taken with Chakravorty (U.S. Patent No. 6,181,569), as applied to claims 1 through 3, 6, 10 through 14, 17, and 23, and further of Abe et al. (U.S. Patent No. 4,610,079). Applicants respectfully traverse this rejection, as hereinafter set forth.

Abe et al. is directed to a method of dicing a semiconductor wafer and is combined with Ohuchi and Chakravorty for the teaching of V-shaped channels having sloped side walls. As previously discussed, claim 1 has been amended to recite the limitation of “forming a layer of encapsulant material over substantially all of said active surface and into said channels *such that a surface of said layer of encapsulant material has a pattern of depressions over said channels.*” (Emphasis added.) None of Ohuchi, Chakravorty, or Abe et al. teach or suggest this limitation. Accordingly, claim 1 is allowable over the cited references, and claim 4, which depends from claim 1, is also allowable.

Obviousness Rejection Based on U.S. Patent No. 6,107,164 to Ohuchi and U.S. Patent No. 6,181,569 to Chakravorty, and further of U.S. Patent No. 5,824,569 to Brooks et al. and U.S. Patent No. 5,908,317 to Héo

Claims 18, 21 through 22, and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohuchi (U.S. Patent No. 6,107,164) and Chakravorty (U.S. Patent No. 6,181,569), as applied to claims 1 through 3, 6, 10 through 14, 17, and 23, and further in view of Brooks et al. (U.S. Patent No. 5,824,569) and Héo (U.S. Patent No. 5,908,317). Applicants respectfully traverse this rejection, as hereinafter set forth.

Brooks et al. discloses a semiconductor device having ball bonded pads and is combined with Ohuchi, Chakravorty, and Héo to provide the teachings of flip-chip bonding and forming an

encapsulant material on the back of a semiconductor substrate. Heo discloses a method of forming chip bumps on chip scale semiconductor packages and is combined with Ohuchi, Chakravorty, and Brooks et al. to provide the teaching of aligning conductive elements to conductive bumps as terminal pads formed on a carrier substrate.

As previously discussed, claim 1 has been amended to recite the limitation of “forming a layer of encapsulant material over substantially all of said active surface and into said channels *such that a surface of said layer of encapsulant material has a pattern of depressions over said channels.*” (Emphasis added.) None of Ohuchi, Chakravorty, Brooks et al., or Heo teach or suggest this limitation. Accordingly, claim 1 is allowable over the cited references, and claims 18, 21 through 22, and 24, which depend from claim 1, are also allowable.

Obviousness Rejection Based on U.S. Patent No. 6,107,164 to Ohuchi and U.S. Patent No. 6,181,569 to Chakravorty, and further of U.S. Patent No. 5,933,713 to Farnworth

Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohuchi (U.S. Patent No. 6,107,164) and Chakravorty (U.S. Patent No. 6,181,569), as applied to claims 1 through 3, 6, 10 through 14, 17, and 23, and further in view of Farnworth. (U.S. Patent No. 5,933,713). Applicants respectfully traverse this rejection, as hereinafter set forth.

The Farnworth ‘713 Patent is directed to a method of forming an overmolded chip scale package and is combined with Ohuchi and Chakravorty to provide the teaching of specific encapsulant materials recited in claim 17. As previously discussed, claim 1 has been amended to recite the limitation of “forming a layer of encapsulant material over substantially all of said active surface and into said channels *such that a surface of said layer of encapsulant material has a pattern of depressions over said channels.*” (Emphasis added.) None of Ohuchi, Chakravorty, or the Farnworth ‘713 Patent teach or suggest this limitation. Accordingly, claim 1 is allowable over the cited references, and claim 17, which depends from claim 1, is also allowable.

Obviousness Rejection Based on U.S. Patent No. 6,107,164 to Ohuchi and U.S. Patent No. 6,181,569 to Chakravorty, and further of U.S. Patent No. 5,933,713 to Farnworth and U.S. Patent No. 6,020,629 to Farnworth

Claims 12 and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohuchi (U.S. Patent No. 6,107,164) and Chakravorty (U.S. Patent No. 6,181,569), as applied to claims 1 through 3, 6, 10 through 14, 17, and 23, and further in view of Farnworth (U.S. Patent No. 5,933,713) and Farnworth (U.S. Patent No. 6,020,629). Applicants respectfully traverse this rejection, as hereinafter set forth.

The Farnworth '713 Patent and the Farnworth '629 are combined with Ohuchi and Chakravorty to provide the teachings of forming pillars of conductor-filled epoxies or metal-filled elastomers as recited in claim 12 and 15. As previously discussed, claim 1 has been amended to recite the limitation of "forming a layer of encapsulant material over substantially all of said active surface and into said channels *such that a surface of said layer of encapsulant material has a pattern of depressions over said channels.*" (Emphasis added.) None of Ohuchi, Chakravorty, the Farnworth '713 Patent, or the Farnworth '629 Patent teach or suggest this limitation. Accordingly, claim 1 is allowable over the cited references, and claims 12 and 15, which depend from claim 1, are also allowable.

Obviousness Rejection Based on U.S. Patent No. 6,107,164 to Ohuchi and U.S. Patent No. 6,181,569 to Chakravorty, and further of U.S. Patent No. 6,137,164 to Yew et al.

Claim 16 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohuchi (U.S. Patent No. 6,107,164) and Chakravorty (U.S. Patent No. 6,181,569), as applied to claims 1 through 3, 6, 10 through 14, 17, and 23, and further of Yew et al. (U.S. Patent No. 6,137,164). Applicants respectfully traverse this rejection, as hereinafter set forth.

Yew et al. discloses a stacked face-to-face integrated circuit packaging structure and is combined with Ohuchi and Chakravorty to provide the teaching of forming an external conductive element from an anisotropically conductive film. As previously discussed, claim 1 has been amended to recite the limitation of "forming a layer of encapsulant material over substantially all of said active surface and into said channels *such that a surface of said layer of*

encapsulant material has a pattern of depressions over said channels.” (Emphasis added.)

None of Ohuchi, Chakravorty, or Yew et al. teach or suggest this limitation. Accordingly, claim 1 is allowable over the cited references, and claim 16, which depends from claim 1, is also allowable.

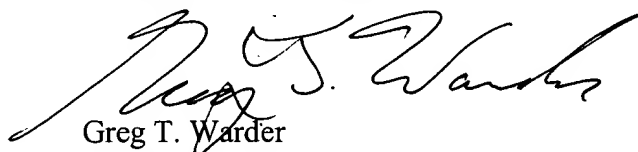
ENTRY OF AMENDMENTS

The amendments to claims 1 through 3, 11 through 18, and 21 through 24 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application.

CONCLUSION

Claims 1 through 4, 6, 10 through 18, and 21 through 24 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Applicants further note that the Office has indicated claim 25 is drawn to a non-elected species and withdrawn it from consideration. Applicants consider claim 1 to be generic, and submit that claim 25 would be allowable upon the allowance of claim 1. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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Date: July 7, 2003
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